

# Mobile-Related Experiences Questionnaire: Validation for Adults from Buenos Aires

## Cuestionario de Experiencias Relacionadas con el Móvil: Validación para adultos de Buenos Aires

Franco Martín Ruscio \* <sup>1</sup>, Juliana B. Stover <sup>2</sup>

1 - Faculty of Psychology, University of Buenos Aires, Buenos Aires, Argentina.

2 - CONICET, Buenos Aires, Argentina; Faculty of Psychology, University of Buenos Aires, Buenos Aires, Argentina.

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### Abstract

The Mobile-Related Experiences Questionnaire is a test designed to assess the experiences of the Spanish population with mobile phones. It consists of 10 items that evaluate the dimensions of Conflict and Communicational and Emotional Use. The aim of this study is to validate the scale in a sample of the local adult population. The sample was composed of 541 adults from Buenos Aires (19.0% male, 80.2% female, 0.7% non-binary), between the ages of 18 and 76 years ( $M = 28.1$ ,  $SD = 9.76$ ). Data were collected using a Sociodemographic Data Survey, the Mobile-Related Experiences Questionnaire, the Generalized Problematic Internet Use Scale 2, and the Symptom Checklist 27. The bifactorial structure was verified by means of a confirmatory factor analysis. The internal consistency was adequate. Evidence of concurrent validity is reported, and reference values are established. In conclusion, this study provides evidence of the psychometric quality of the questionnaire in a local sample.

**Keywords:** *ICT, Internet, smartphone, validity, reliability*

### Resumen

El Cuestionario de Experiencias Relacionadas con el Móvil es un instrumento diseñado para su uso con población española. Consta de 10 ítems que evalúan las dimensiones de Conflicto y Uso Comunicacional y Emocional. El objetivo de este trabajo es adaptar dicha escala para evaluar población adulta local. Se trabajó con 541 adultos de Buenos Aires (19.0% Hombres, 80.2% Mujeres, 0.7% No Binario), de entre 18 y 76 años ( $M = 28.1$ ,  $DE = 9.76$ ). Se recolectaron datos con una Encuesta de datos socio-demográficos, el Cuestionario de Experiencias Relacionadas con el Móvil, la Generalized Problematic Internet Use Scale 2 y el Symptom Checklist 27. Mediante un análisis factorial confirmatorio se verificó la estructura bifactorial. La consistencia interna fue adecuada. Se reportan evidencias de validez concurrente. Se confeccionaron baremos. Se concluye que se aporta un instrumento de evaluación con evidencias de calidad psicométrica en una muestra local.

**Palabras clave:** *ICT, Internet, smartphone, validez, fiabilidad*

\*Correspondence to: [julianastover@psi.uba.ar](mailto:julianastover@psi.uba.ar), Gral. Juan Lavalle 2353 (C1052AAA), Buenos Aires, Argentina. Teléfono.: +54.11.4952.5481/5490.

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## Introduction

The mobile phone has become an indispensable object in everyday life, not only due to its communication capabilities but also thanks to its easy access to the internet, its ability to take photographs, record videos, search and share information, perform transactions, and even work and study through the device (Herrera-Batista, 2009; van Velthoven et al., 2018). Its presence in people's daily lives has transformed the ways in which individuals interact with one another and their relationship with technology. The use of mobile phones has brought about changes and improvements in communication, social inclusion, economic activities, and productivity in various sectors (Pepper et al., 2012).

According to a survey conducted by the National Institute of Statistics and Census (INDEC) on the use and access to information and communication technologies (ICT) in Argentina, 88.1% of individuals use a mobile phone, while 87.2% have internet access. In the specific case of Buenos Aires, these numbers increase: Over 92% utilize the internet, and more than 94% of citizens use mobile phones, making them the most widely used technological device in the region, surpassing computers. These data indicate a high adoption of mobile devices among urban dwellers (INDEC, 2021).

In recent years, the focus has shifted towards the potential problems that excessive cellphone use can cause in people's daily lives, affecting academic, occupational, social, and family performance, and consequently, their relationships with others (Busch & McCarthy, 2021; Rodríguez-Ceberio et al., 2019).

In the field of Psychology, it is well-known that addiction or dependency is not solely limited to substance consumption, such as drugs or alcohol. Certain behavioral patterns can also lead to

dependency issues, and one of the most recent and highly specific forms of behavioral dependency is related to the dysfunctional use of ICT (Billieux et al., 2015; Chóliz et al., 2017). Several authors suggest refraining from using the term *addiction* when referring to *pathological* or *abusive* use of new technologies like the cellphone, as excessive and dependent technology use does not solely fit the addictive behavior model, as is the case with psychoactive substances (Carbonell et al., 2012b). Nevertheless, the excessive use of these technologies has caused numerous problems in individuals' family, academic, occupational, and personal domains (van Velthoven et al., 2018). As early as 1995, Griffiths addressed this issue proposing the concept of technological addictions, which are highly prevalent today through various mediums and forms. In the case of ICT, the problem lies not so much in the frequency of use, but in the dependency relationship it creates, leading to a loss of control over one's behavior and significant interference in daily life. Consequently, individuals with abusive cellphone use experience physical and psychological issues, such as anxiety, palpitations, and sweating, particularly when unable to use their device, for example, when forgetting it at home or experiencing low balance, coverage or battery (Echeburúa & de Corral, 2010).

Regarding the symptomatic manifestation of pathological mobile phone use, Chóliz et al. (2017) argue that, similar to pathological gambling and other dependencies, problematic use of these electronic devices is characterized by: a strong need to use the technology to achieve the same level of well-being as initially experienced (tolerance); various negative emotional reactions that arise when unable to use the device or during extended periods without using it (withdrawal); difficulties in daily life and across different domains due to the abusive use; and the inability to stop using the device, even though the individual

recognizes that its use may be inappropriate or potentially dangerous.

Currently, this problem is not considered a mental disorder according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Although a new category called “Addictive and Substance-Related Disorders” is included, only pathological gambling disorder has been recognized as a behavioral addiction (American Psychiatric Association [APA], 2014). The same applies to other diagnostic manuals, such as the International Classification of Diseases and Related Health Problems (ICD) by the World Health Organization (WHO, 2019). In any case, the pathological use of cell phones could be seen with the same characteristics of dependency disorders, but without intoxication by any substance (Redondo-Pacheco et al., 2016). However, despite not being classified as a disorder *per se*, due to the consequences of excessive technology use, researchers have shown interest in determining the incidence, prevalence, and causes of problematic ICT use, particularly in relation to internet and mobile phone use. Emphasis has been placed on the importance of having tools to identify where excessive use occurs and when it may become pathological (Simó-Sanz et al., 2017).

Various studies have been conducted on mobile phone use. Taking gender into account, the results indicate that women engage in more maladaptive use (Beranuy et al., 2009b; Carbonell et al., 2012a; Chóliz et al., 2009; Labrador-Encinas & Villadangos-González, 2010; López-Fernández et al., 2012; Sánchez-Martínez & Otero, 2009). In the case of Argentina, a study conducted in 2020 found that women scored significantly higher than men in aspects of withdrawal and loss of control in mobile phone use. While both men and women viewed the use of technological devices positive for staying connected with their families, women reported a higher frequency of

use than men and displayed greater dependence on the device (Duraó et al., 2021).

The abusive use of the device has been associated with different problems (e.g., Sohn et al., 2019), such as lower self-esteem (Bianchi & Phillips, 2005; Casale et al., 2022; Graben et al., 2020), feelings of loneliness (Menglong & Liya, 2017), anxiety (Foerster et al., 2015; Richardson et al., 2018), depression (Elhai et al., 2017; Güzeller & Coşguner, 2012; Rozgonjuk et al., 2018), sleep disorders (Xie et al., 2018) and lower psychological well-being (Horwood & Anglim, 2019). Other authors have investigated the harmful effects associated with different forms of mobile harassment (Turan et al., 2011), as well as an increased risk of occupational and traffic accidents related to inattention and sensory interference during its use (Backer-Grøndahl & Sagberg, 2011).

#### *Assessment Instruments for Mobile Phone Use*

Currently, there are various assessment instruments available for measuring variables related to mobile phone use (Harris et al., 2020). Toda et al. (2006) developed the Mobile Phone Dependence Questionnaire (MPDQ), consisting of 20 items that measure the degree of dependence on the cellphone. Bianchi and Phillips (2005) created the Mobile Phone Problem Use Scale (MP-PUS), comprising 27 items related to social problems arising from cell phone use. There is also an adaptation of the scale for use with Spanish adolescents (López-Fernández et al., 2012) and Ecuadorian university students (García-Umaña & Córdoba-Pillajo, 2020). Another instrument is the Problematic Mobile Phone Use Questionnaire (PMPUQ; Billieux et al., 2008), which assesses different types of mobile phone use through 30 items. Chóliz (2012) designed the Mobile Phone Dependency Test (TDM), originally consisting of

22 items that examine the main characteristics of cell phone dependence. In 2016, the same author selected the most representative items from the original TDM version and developed a reduced version (TDMB) consisting of 12 items. This version was adapted for the Argentine context (Duro et al., 2021) for use with students and has been validated for use with Peruvian (Gamero et al., 2016) and Brazilian populations (Flores-Robaina et al., 2013).

Another scale is the Problematic Use Mobile Phone (PUMP) developed by Merlo et al. (2013). It consists of 20 items that measure symptoms of problematic cellphone use, based on the substance addiction criteria of the DSM-5.

Lastly, the Mobile Phone-Related Experiences Questionnaire (CERM; Beranuy-Farques et al., 2009a) is an instrument that assesses problematic mobile phone use using 10 Likert scale items ranging from 1 (*Not at all*) to 4 (*Very much*). The items are related to negative effects on behavior, social relationships, reduction of activities due to mobile phone use, loss of control, and intense desire to be connected. As for validation, the instrument was administered to a sample of 1879 students from Catalan educational centers, including university and secondary education students aged 12 to 25. An exploratory factor analysis was conducted using the Generalized Least Squares (GLS) method with Oblimin rotation. The one-factor model showed an unsatisfactory fit, while the two-factor solution demonstrated acceptable data fit. Thus, the final version of the instrument is organized into two factors. The first factor (Conflicts) consists of 5 items explaining 34.6% of the variance, and the second factor (Communicational and Emotional Use) includes 5 items explaining 9.22% of the variance. The internal consistency of the dimensions estimated with Cronbach's alpha was .81 and .75, respectively. Concurrent validity studies were also

conducted with six dichotomous items used by de Gracia-Blanco et al. (2002) to assess problematic cellphone use, revealing positive and strong correlations for both the Conflict factor ( $r = .44$ ) and the Communicational and Emotional Use factor ( $r = .60$ ).

Psychometric studies of the scale were carried out in the Colombian population. A study was conducted with 639 students aged 12 to 25 (Redondo-Pacheco et al., 2016). The internal consistency of the total score yielded an  $\alpha$  of .79. The same analyses were performed in the Chilean context (Inostroza et al., 2019). Working with 180 university students aged 18 to 30, Cronbach's alphas of .60 for Conflicts and .73 for Communicational and Emotional Use were found.

Due to its brevity, the CERM presents itself as a useful instrument for examining cellphone use through easy administration and evaluation. Since there are no studies available in the local population yet and considering the importance of having validated instruments in the country (Fernández et al., 2010), the objective of this study is to carry out the conceptual, linguistic, and metric adaptation of the CERM for its use with the adult population in Buenos Aires.

## Methods

A non-experimental and cross-sectional design was conducted. The type of study carried out was correlational. A non-probabilistic sampling was employed.

### *Participants*

The sample was composed of 541 adults residing in the City of Buenos Aires and its surroundings (19.0% males, 80.2% females, 0.7%

**Table 1**  
Sociodemographic data. Frequencies.

	n	%
<b>Gender</b>		
Male	103	19.9%
Female	434	80.2%
Non-binary	4	0.7%
<b>Marital status</b>		
Single	270	49.9%
Dating (without living together)	201	37.2%
Dating (living together)	3	0.6%
Married	53	9.8%
Separated/Divorced	13	2.4%
Other	1	0.2%
<b>Maximum educational level achieved</b>		
Incomplete High-School Education	10	1.8%
Complete High-School Education	90	16.6%
Incomplete Tertiary Education	24	4.4%
Complete Tertiary Education	29	5.4%
Incomplete University Education	252	46.6%
Complete University Education	81	15.0%
Incomplete Postgraduate Education	20	3.7%
Complete Postgraduate Education	35	6.5%
<b>Currently working</b>		
Yes	371	68.6%
No	170	31.4%
<b>Currently studying</b>		
Yes	350	64.7%
No	191	35.3%
<b>Socioeconomic status</b>		
Low	19	3.5%
Lower-Middle	135	25.0%
Middle	308	56.9%
Upper-Middle	776	14.0%
High	3	0.6%
<b>Residential location</b>		
CABA	181	33.5%
Buenos Aires	360	66.5%

non-binary), ranging in age from 18 to 76 years ( $M = 28.1$ ,  $SD = 9.76$ ). Most participants were single at the time of the evaluation (49.9%). A high level of education was observed, with 81.6% of participants having at least some university or tertiary education. Additionally, 64.7% of the sample reported currently being enrolled in studies. Regarding their employment status, more than half of the participants were employed (68.6%). Many participants identified with a middle socio-economic level (56.9%). Table 1 provides a detailed overview of all socio-demographic data.

Additionally, a test-retest study was conducted with a subsample of 21 participants (85.7% females, 14.3% males;  $M_{age} = 26.9$ ,  $SD_{age} = 6.98$ ).

### Material

**Sociodemographic Data Survey.** Designed specifically for this study, this survey collects information on gender, age, marital status, employment status, educational status, level of education, cohabitation group, and perceived socioeconomic level.

**Mobile Phone-Related Experiences Questionnaire (CERM; Beranuy-Fargues et al., 2009a).**

Consisting of 10 items with a Likert response format ranging from *Not at all* to *Very much*, this questionnaire assesses mobile phone-related problematic use. It includes two dimensions: Conflict and Communicational and Emotional Use. Adaptation of this instrument is the focus of this study.

**Generalized Problematic Internet Use Scale 2 (GPIUS2; Caplan, 2010).** This scale evaluates generalized problematic internet use. It consists of 15 items with a Likert response format ranging from *Strongly disagree* to *Strongly agree*. The scale is composed of four subscales: Preference for Online Social Interaction (POSI), Mood Regulation

(MR), Negative Outcomes (NO), and Deficient Regulation (DR), which includes the subscales of Compulsive Use (CU) and Cognitive Preoccupation (CP). An adaptation for use with the population of Buenos Aires was conducted (Stover et al., 2023). Previous studies have reported Cronbach's alphas ranging from .83 to .87 for its subscales, indicating good internal consistency (Stover & Tisocco, 2020).

**Symptom Checklist 27 (SCL-27; de la Iglesia & Castro-Solano, 2019; Hardt & Gerbershagen, 2001).** This scale assesses non-specific psychopathological symptoms experienced in the past seven days. It consists of 27 items grouped into a single dimension, which was confirmed through confirmatory factor analysis. The response format is a 5-point Likert scale ranging from *Not at all* to *Very much*. It has adequate internal consistency ( $\alpha = .92$ ).

### Procedure

Initially, a pilot administration was conducted with 10 adults from Buenos Aires to assess facies validity. As a result, the term "mobile" was modified to "cell phone" in the items. Subsequently, an expert judgment procedure was conducted with five experts in psychometrics to evaluate the proper operationalization of the construct through the items. The judges reached 80% to 100% agreement on all items, and no modifications were suggested. After these steps, the standardization sample was collected using a Google form. The form was disseminated through social networks and email lists of participants from previous research studies. Informed consent was obtained, guaranteeing anonymity and confidentiality of the responses, and the research objectives were explained.

**Table 2**  
CERM items. Descriptive statistics.

Item	M	SD	Skewness	Kurtosis
1. Have you been at risk of losing an important relationship, a job or an academic opportunity due to the use of your cell phone?	1.27	.55	2.30	5.72
2. Do you think that your academic or work performance has been negatively affected by cell phone use?	2.12	.92	0.33	-0.85
3. Do you suffer from sleep disturbances due to aspects related to your cell phone?	2.25	.99	0.24	-1.02
4. Do you feel the need to invest more and more time on your cell phone to feel satisfied?	1.73	.90	0.96	-0.14
5. Do you stop going out with your friends because you spend more time using your cell phone?	1.15	.47	3.66	14.75
6. To what extent do you feel restless when you do not receive messages or calls?	1.87	.85	0.72	-0.19
7. When you get bored, do you use your cell phone as a form of distraction?	3.45	.72	-1.31	1.60
8. How often do you say things on your cell phone that you would not say in person?	2.16	.89	0.30	-0.73
9. Do you think that life without the cell phone is boring, empty and sad?	1.87	.87	0.76	-0.18
10. Do you get angry or irritated when someone bothers you while you use your cell phone?	1.70	.810	1	0.37

**Table 3**  
Adjustment indices. CERM models.

	S-B $\chi^2$	gl	S-B $\chi^2$ /gl	CFI	IFI	RMSEA [90% CI]
2 Factors	132.228	34	3.889	.948	.949	.073 [.060, .086]
1 Factor	127.871	35	3.653	.872	.874	.070 [.057, .083]

As an initial step, univariate and multivariate normality were analyzed using descriptive statistics (mean, standard deviation, skewness, and kurtosis) and the Mardia coefficient to examine multivariate normality. Due to the violation of the multivariate normality assumption (Tabachnick & Fidell, 2013), a confirmatory factor analysis (CFA) was conducted using the Maximum Likelihood (ML) method with robust estimators, considering polychoric matrices due to the ordinal nature of the variables (Freiberg-Hoffmann et al., 2013; Muthén & Kaplan, 1985). CFA was chosen because previous information about the distribution of the data from the Spanish version was available and because CFAs are less dependent on sample characteristics than exploratory factor analyses (Richaud de Minzi, 2008). Unifactorial and bifactorial models were tested based on previous analyses of the original version (Beranuy-Fargues et al., 2009a). The analyses were performed using EQS 6.2 software (Bentler & Wu, 2012). Model fit was evaluated using various indices. Satorra-Bentler Chi-Square Correction (S-B $\chi^2$ ; 2001) was estimated by dividing the degrees of freedom (S-B $\chi^2$ /df), with values ranging from 1 to 3 considered appropriate (Carmines & McIver, 1981). Comparative Fit Index (CFI) and Bollen's Fit Index (IFI) cutoff was set at .90. Finally, Root Mean Square Error of Approximation (RMSEA) values between .05 and .08 were considered appropriate (Browne & Cudeck, 1993; Byrne, 2006; Hu & Bentler, 1999).

Ordinal alpha coefficients (Elosua-Oliden & Zumbo, 2008) and Cronbach's alphas were then estimated. The attenuation index between these

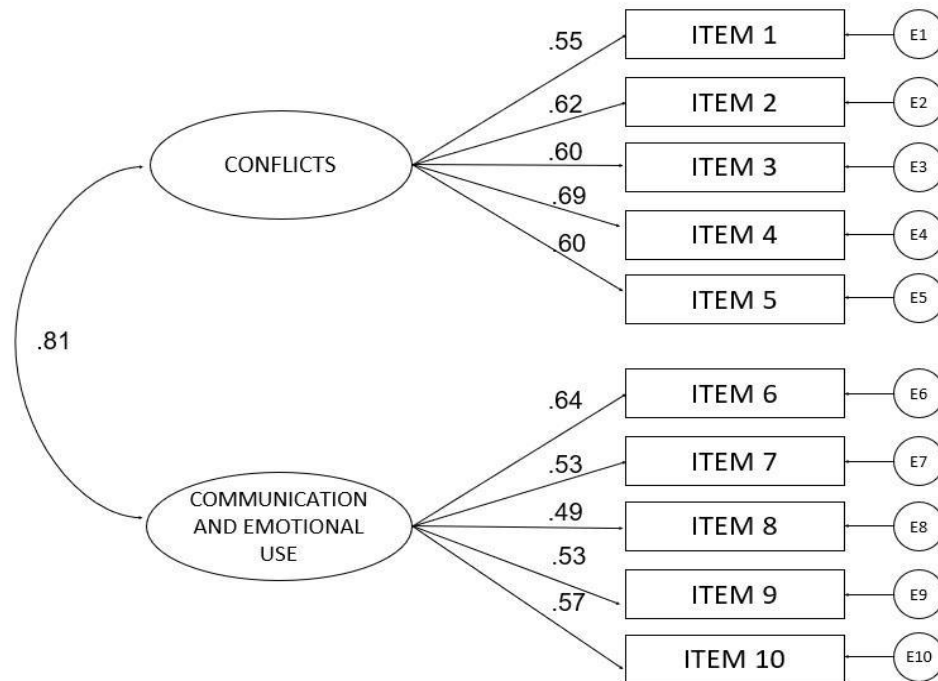
coefficients was calculated (Dominguez-Lara, 2018). Pearson correlations ( $r$ ) were calculated between the factors of the CERM, GPIUS-2, and SCL-27. To examine the test-retest stability of the scores, the CERM was administered again to 21 participants after a 20-day interval. Pearson correlations were calculated between the scores of the dimensions. Effect size interpretations followed Cohen's guidelines: small = .10, medium = .30, large = .50 (Cohen, 1988). Independent samples t-tests were conducted to examine gender differences for the purpose of evaluating separate norms based on gender. Non-binary gender was not considered in this comparison due to the small number of participants (four individuals), representing 0.7% of the sample. The calculations were performed using Jamovi software (The Jamovi Project, 2023).

## Results

### *Evidence of Construct Validity*

Initially, skewness and kurtosis values of the items were calculated to evaluate univariate normality (Table 2). Most of the items had values within  $\pm 1.96$ . When assessing multivariate normality, the Mardia coefficient was 38.96. Therefore, robust estimators were chosen for the CFA (Tabachnick & Fidell, 2013).

The unifactorial and bifactorial models were compared by means of two CFAs carried out with the Maximum Likelihood method based on the polychoric matrices (Table 3). The S-B $\chi^2$ /gl value was slightly lower in the unidimensional model.



**Figure 1**  
Parameters. CERM.

The CFI and IFI values exceeded the cutoff of .90 in the bifactorial model, but not in the unifactorial model. The RMSEA values were similar and within the expected range. Considering the CFI and IFI values, the decision was made to choose the two-factor model.

The parameters were statistically significant. The factor loadings ranged from .49 to .64. The correlation between the dimensions was .81 (Figure 1).

#### *Internal Consistency*

The internal consistency, estimated using Cronbach's alpha, was adequate, and when calculating ordinal alphas, it increased to .74 for Conflicts and .68 for Communication and Emotional Use. The attenuation index between both alphas was less than 30% (Table 4).

**Table 4**  
CERM. Internal consistency.

	Ordinal Alpha	Cronbach's Alpha	Attenuation Index
Conflicts	.74	.69	8%
Communication and Emotional Use	.68	.66	4%



**Table 5**  
CERM, GPIUS-2, SCL-27. Correlations.

	Conflicts	Communication and Emotional Use
Preference for Social Online Interaction	.30**	.38**
Negative Outcomes	.62**	.46**
Mood Regulation	.41**	.51**
Compulsive Use	.50**	.52**
Cognitive Preoccupation	.48**	.54**
SCL-27	.51**	.50**

Note. \*\* = <.01.

### *Evidence of Concurrent Validity with GPIU-2 and SCL-27*

When calculating Pearson correlation between the dimensions of CERM and GPIUS-2, significant positive correlations were found in all cases. The highest effect sizes were observed between the Conflict factor and Negative Outcomes ( $r = .62$ ) and Compulsive Use ( $r = .50$ ). There were also significant positive correlations between the Communication and Emotional Use factor and Cognitive Preoccupation ( $r = .54$ ), Compulsive Use ( $r = .52$ ), and Mood Regulation ( $r = .51$ ). When examining the relationship with

psychopathological symptoms, significant positive correlations with a strong effect size were found in both dimensions (Table 5).

### *Temporal Stability*

Correlations were calculated between the total scores of each dimension at the two time points. A correlation coefficient of  $r = .72$  was obtained for Conflict and  $r = .82$  for Communication and Emotional Use.

### *Norms*

Prior to establishing norms, an independent sample t-test was conducted to examine gender differences in cellphone use. No significant differences were found in either the Conflict dimension ( $t = -1.30$ , 535 *df*,  $p = .195$ ,  $d = -0.14$ ;  $M_{\text{male}} = 8.20$  vs.  $M_{\text{female}} = 8.59$ ) or the Communication and Emotional Use dimension ( $t = -1.74$ , 535 *df*,  $p = .083$ ,  $d = -0.19$ ;  $M_{\text{male}} = 10.61$  vs.  $M_{\text{female}} = 11.13$ ). Therefore, norms were developed for the entire sample (Table 6).

**Table 6**  
CERM. percentiles.

Percentile	Conflicts	Communication and Emotional Use
10	5	8
20	6	9
25	6	9
30	7	10
40	7	10
50	8	11
60	9	12
70	10	12
75	10	13
80	11	13
90	12	15

## Discussion

In the present study, the Mobile-Related Experiences Questionnaire (CERM; [Beranuy et al., 2009a](#)) was validated for use with the local adult population. When analyzing the dimensionality of the CERM and comparing unifactorial and bifactorial models through two confirmatory factor analyses (CFA), the latter was chosen. This structure replicates the original version ([Beranuy-Fargues et al., 2009a](#)), where better fit was found for the two-factor option compared to the unidimensional one. Regarding the internal consistency of the CERM, estimated through Cronbach's alpha, it was found to be adequate, and the ordinal alphas further increased. These findings are consistent with previous studies ([Beranuy-Fargues et al., 2009a](#); [Inostroza et al., 2019](#); [Redondo-Pacheco et al., 2016](#)).

To establish associations between mobile-related experiences and generalized problematic internet use, Pearson correlation coefficients were calculated between the CERM dimensions and the GPIUS-2, revealing positive correlations in all cases, providing evidence of concurrent criterion validity. These results align with previous studies that have also reported associations between cellphone use and internet use ([Beranuy et al., 2009a](#); [Inostroza et al., 2019](#)). Additionally, it is worth mentioning that one of the main functions that makes cellphones so attractive is its easy access to the internet ([Herrera-Batista, 2009](#)). Furthermore, when correlating CERM responses with those of the SCL-27 to establish concurrent validity evidence with non-specific psychopathological symptoms, significant positive correlations were also found. Various studies have previously linked cellphone use to psychopathological symptoms such as depression, social anxiety, and sleep disorders (e.g., [Elhai et al., 2017](#); [Foerster et al., 2015](#); [Güzeller & Coşguner,](#)

[2012](#); [Richardson et al., 2018](#); [Rozgonjuk et al., 2018](#); [Sohn et al., 2019](#); [Xie et al., 2018](#)). Finally, the temporal stability of the scores generated by the instrument was also adequate.

Due to previous research reporting gender differences ([Beranuy et al., 2009b](#); [Chóliz et al., 2009](#); [Durao et al., 2021](#); [Labrador-Encinas & Villadangos-González, 2010](#); [López-Fernández et al., 2012](#); [Sánchez-Martínez & Otero, 2009](#)), the means of men and women were compared for the two dimensions of the CERM. As no statistically significant differences were found, as the final step of this study, norms were established to enable the use of the adapted instrument in various applications.

In summary, this study contributes to technology transfer by providing a brief, easy-to-administer and evaluate instrument aimed at analyzing cellphone use in adults in Buenos Aires, a construct for which there is limited research in the country (e.g., [Cabañas & Korzeniowski, 2015](#); [Durao et al., 2021](#)). Given that cellphones are the most widely used technological device in the region ([INDEC, 2021](#)), it is of interest to understand their impact on daily life and people's health ([Busch & McCarthy, 2021](#); [Sohn et al., 2019](#); [van Velthoven et al., 2018](#)).

However, certain limitations should be taken into account when considering the results. Firstly, the sample is predominantly composed of women with a high level of education. Further studies are needed to confirm the psychometric quality of the instrument, such as examining factorial invariance across different samples.

Additionally, the fact that the questionnaires are self-administered could be controversial, as problematic behaviors tend to be concealed ([Redondo-Pacheco et al., 2016](#)). It would be interesting to expand the research with other forms of assessment, such as observation or the involvement of third parties to provide information on

the evaluated person's cellphone use, in order to analyze the behavior more comprehensively (e.g., Ryding & Kuss, 2020; Rozgonjuk et al., 2018). In future lines of research, it would be relevant to expand the study to other regions of the country to determine if the cellphone use situation in the Buenos Aires Metropolitan Area is replicated elsewhere in the country or to identify any differences that may exist.

## References

- American Psychological Association [APA]. (2014). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. APA.
- Backer-Grøndahl, A., & Sagberg, F. (2011). Driving and telephoning: Relative accident risk when using hand-held and hands-free mobile phones. *Safety Science*, 49(2), 324-330. <https://doi.org/10.1016/j.ssci.2010.09.009>
- Bentler, P. M., & Wu, E. J. C. (2012). EQS 6.2 for Windows. [software de cómputo]. Multivariate Software.
- Beranuy-Fargues, M., Chamarro-Lusar, A., Graner-Jordania, C., & Carbonell-Sánchez, X. (2009a). Validación de dos escalas breves para evaluar la adicción a Internet y el abuso de móvil [Validation of two brief scales to assess Internet addiction and mobile phone abuse]. *Psicothema*, 21(3), 480-485. <https://www.psicothema.com/es>
- Beranuy, M., Oberst, U., Carbonell, X., & Chamarro, A. (2009b). Problematic Internet and mobile phone use and clinical symptoms in college students: The role of emotional intelligence. *Computers in Human Behaviour*, 25(5), 1182-1187. <https://doi.org/10.1016/j.chb.2009.03.001>
- Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior*, 8(1), 39-51. <https://doi.org/10.1089/cpb.2005.8.39>
- Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports*, 2(2), 156-162. <https://doi.org/10.1007/s40429-015-0054-y>
- Billieux, J., Van der Linden, M., & Rochat, L. (2008). The role of impulsivity in actual and problematic use of the mobile phone. *Applied Cognitive Psychology*, 22(9), 1195-1210. <https://doi.org/10.1002/acp.1429>
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Sage.
- Busch, P. A., & McCarthy, S. (2021). Antecedents and consequences of problematic smartphone use: A systematic literature review of an emerging research area. *Computers in Human Behavior*, 114, 106414. <https://doi.org/10.1016/j.chb.2020.106414>
- Byrne, B. M. (2006). *Structural equation modeling with EQS: Basic concepts, applications, and programming (2<sup>nd</sup> ed.)*. Lawrence Erlbaum.
- Cabañas, M., & Korzeniowski, C. (2015). Uso de celular e Internet: Su relación con planificación y control de la interferencia [Use of cell phones and the Internet: Their relationship with planning and control of interference]. *Revista Argentina de Ciencias Del Comportamiento [Argentine Journal of Behavioral Sciences]*, 7(1), 5-16. <https://revistas.unc.edu.ar/index.php/racc/index>
- Caplan, S. E. (2010). Theory and measurement of generalized problematic Internet use: A two-step approach. *Computers in Human Behavior*, 26(5), 1089-1097. <https://doi.org/10.1016/j.chb.2010.03.012>
- Carbonell, X., Chamarro, A., Griffiths, M., Oberst, U., Cladellas, R., & Talam, A. (2012a). Problematic Internet and cell phone use in Spanish teenagers and young students. *Anales de Psicología [Annals of Psychology]*, 28(3), 789-796. <https://doi.org/10.6018/analesps.28.3.156061>
- Carbonell, X., Fúster, H., Chamarro, A., & Oberst, U.

- (2012b). Adicción a Internet y móvil: Una revisión de estudios empíricos españoles [Internet and mobile addiction: A review of Spanish empirical studies]. *Papeles del Psicólogo [Psychologist Papers]*, 33(2), 82-89. <https://www.papelesdelpsicologo.es>
- Carmines, E. G., & McIver, J. P. (1981). Analyzing models with unobserved variables: Analysis of covariance structures. In G. W. Bohrnstedt & E. F. Borgatta (Eds.), *Social Measurement: Current Issues* (pp. 65-115). Sage.
- Casale, S., Fioravanti, G., Bocci-Benucci, S., Falone, A., Ricca, V., & Rotella, F. (2022). A meta-analysis on the association between self-esteem and problematic smartphone use. *Computers in Human Behavior*, 134. <https://doi.org/10.1016/j.chb.2022.107302>
- Chóliz, M. (2012). Mobile-phone addiction in adolescence: The Test of Mobile Phone Dependence (TMD). *Progress in Health Sciences*, 2(1), 33-44. [https://progressinhealthsciences.publisherspanel.com/resources/html/cms/EDITORIAL\\_OFFICE](https://progressinhealthsciences.publisherspanel.com/resources/html/cms/EDITORIAL_OFFICE)
- Chóliz, M., Echeburúa, E., & Ferre, F. (2017). Screening tools for technological addictions: A proposal for the strategy of mental health. *International Journal of Mental Health and Addiction*, 15(2), 423-433. <https://doi.org/10.1007/s11469-017-9743-1>
- Chóliz, M., Villanueva, V., & Chóliz, M. C. (2009). Ellas, ellos y su móvil: Uso, abuso (¿y dependencia?) del teléfono móvil en la adolescencia [They and their mobile: Use, abuse (and dependence?) of the mobile phone in adolescence]. *Revista Española de Drogodependencias [Spanish Magazine on Drug Addiction]*, 34(1), 74-88. <https://www.aesed.com/es>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). LEA.
- de Gracia-Blanco, M., Vigo-Anglada, M., Fernández-Pérez, M. J., & Marcó-Arbonès, M. (2002). Problemas conductuales relacionados con el uso de Internet: Un estudio exploratorio [Behavioral problems related to the use of the Internet: an exploratory study]. *Anales de Psicología [Annals of Psychology]*, 18(2), 273-292. <https://revistas.um.es/analesps>
- de la Iglesia, G., & Castro-Solano, A. (2019). Academic achievement of college students: The role of the positive personality model. *Problems of Education in the 21<sup>st</sup> Century*, 77(5), 572-583. <https://doi.org/10.33225/pec/19.77.572>
- Dominguez-Lara, S. (2018). Fiabilidad y alfa ordinal [Reliability and ordinal alpha]. *Actas Urológicas Españolas [Spanish Urological Acts]*, 42(2), 140-141. <https://doi.org/10.1016/j.acuro.2017.07.002>
- Durao, M., Etchezahar, E., Ungaretti, J., & Calligaro, C. (2021). Propiedades psicométricas del Test de Dependencia al Teléfono Móvil (TDMB) en Argentina y sus relaciones con la impulsividad [Psychometric properties of the Mobile Phone Dependency Test (TDMB) in Argentina and its relationship with impulsivity]. *Actualidades en Psicología [News in Psychology]*, 35(130), 1-18. <https://doi.org/10.15517/ap.v35i130.41963>
- Echeburúa, E., & de Corral, P. (2010). Adicción a las nuevas tecnologías y a las redes sociales en jóvenes: Un nuevo reto [Addiction to new technologies and social networks in young people: a new challenge]. *Adicciones [Addictions]*, 22(2), 91-96. <https://doi.org/10.20882/adicciones.196>
- Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of Affective Disorders*, 207, 251-259. <https://doi.org/10.1016/j.jad.2016.08.030>
- Elosua-Oliden, P., & Zumbo, B. D. (2008). Coeficientes de confiabilidad para escalas de respuesta categórica ordenada [Reliability coefficients for ordered categorical response scales]. *Psicothema*, 20(4), 896-901. <https://www.psicothema.com>
- Fernández, A., Pérez, E., Alderete, A. M., Richaud, M. C., & Fernández-Liporace, M. (2010). ¿Construir o Adaptar Tests Psicológicos? Diferentes respuestas a una cuestión controvertida [Build or Adapt Psychological Tests? Different Answers to a Controversial Question]. *Revista Evaluar [Evaluate Magazine]*,

- 10(1). <https://doi.org/10.35670/1667-4545.v10.n1.459>
- Freiberg-Hoffmann, A., Stover, J. B., de la Iglesia, G., & Fernández-Liporace, M. (2013). Correlaciones polichóricas y tetrachóricas en estudios factoriales exploratorios y confirmatorios [Polychoric and tetrachoric correlations in exploratory and confirmatory factorial studies in coexistence]. *Ciencias Psicológicas [Psychological Science]*, 7(2), 151-164. <https://doi.org/10.22235/cp.v7i1.1057>
- Flores-Robaina, N., Jenaro-Río, C., González-Gil, F., Martín-Pastor, E., & Poy-Castro, R. (2013). Adicción al móvil en alumnos de secundaria: Efectos en la convivencia [Mobile phone addiction in secondary school students: Effects on coexistence]. *European Journal of Investigation in Health, Psychology and Education*, 3(3), 215-225. <https://doi.org/10.3390/ejihpe3030019>
- Foerster, M., Roser, K., Schoeni, A., & Rössli, M. (2015). Problematic mobile phone use in adolescents: Derivation of a short scale MPPUS-10. *International Journal of Public Health*, 60(2), 277-286. <https://doi.org/10.1007/s00038-015-0660-4>
- Gamero, K., Flores, C., Arias, W. L., Ceballos, K. D., Román, A., & Marquina, E. (2016). Estandarización del Test de Dependencia al Celular para estudiantes universitarios de Arequipa [Standardization of the Cellular Dependency Test for Arequipa university students]. *Persona [Person]*, 19, 179-200. <https://doi.org/10.26439/persona2016.n019.979>
- García-Umaña, A., & Córdoba-Pillajo, É. (2020). Validación de escala MPPUS-A sobre el uso problemático del smartphone [Validation of scale MPPUS-A on the problematic use of the smartphone]. *Pixel-Bit. Revista de Medios y Educación [Pixel-Bit. Media & Education Magazine]*, 57, 173-189. <https://doi.org/10.12795/pixelbit.2020.i57.07>
- Graben, K., Doering, B. K., Jeromin, F., & Barke, A. (2020). Problematic mobile phone use: Validity and reliability of the Problematic Use of Mobile Phone (PUMP) Scale in a German sample. *Addictive Behaviors Reports*, 12, 100297. <https://doi.org/10.1016/j.abrep.2020.100297>
- Griffiths, M. D. (1995). Technological addictions. *Clinical Psychology Forum*, 1(76), 14-19. <https://doi.org/10.53841/bpscpf.1995.1.76.14>
- Güzeller, C. O., & Coşguner, T. (2012). Development of a Problematic Mobile Phone Use Scale for Turkish adolescents. *Cyberpsychology, Behavior and Social Networking*, 15(4), 205-211. <https://doi.org/10.1089/cyber.2011.0210>
- Hardt, J., & Gerbershagen, H. U. (2001). Cross-validation of the SCL-27: A short psychometric screening instrument for chronic pain patients. *European Journal of Pain*, 5(2), 187-197. <https://doi.org/10.1053/eujp.2001.0231>
- Harris, B., Regan, T., Schueler, J., & Fields, S. A. (2020). Problematic Mobile Phone and Smartphone Use Scales: A systematic review. *Frontiers in Psychology*, 11, 672. <https://doi.org/10.3389/fpsyg.2020.00672>
- Herrera-Batista, M. Á. (2009). Disponibilidad, uso y apropiación de las tecnologías por estudiantes universitarios en México: Perspectivas para una incorporación innovadora [Availability, use and appropriation of technologies by university students in Mexico: Perspectives for an innovative incorporation]. *Revista Iberoamericana de Educación [Ibero-American Magazine of Education]*, 48(6), 1-9. <https://doi.org/10.35362/rie4862130>
- Horwood, S., & Anglim, J. (2019). Problematic smartphone usage and subjective and psychological well-being. *Computers in Human Behavior*, 97, 44-50. <https://doi.org/10.1016/j.chb.2019.02.028>
- Hu, L., & Bentler, P. M. (1999). Cut off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1-55. <https://doi.org/10.1080/10705519909540118>
- Inostroza, T., Madrid, F., Salinas, M., Reyes, E., & Guerra, C. (2019). Estructura factorial del Cuestionario de Experiencias Relacionadas con Internet en universitarios chilenos [Factorial structure of the Inter-

- net-Related Experiences Questionnaire in Chilean university students]. *Interdisciplinaria [Interdisciplinary]*, 36(2), 55-68. <https://doi.org/10.16888/interd.2019.36.2.4>
- Instituto Nacional de Estadística y Censos [National Institute of Statistics and Censuses, INDEC]. (2021). *Acceso y uso de tecnologías de la información y la comunicación. Cuarto trimestre del 2021*. [Access and use of information and communication technologies. Fourth quarter of 2021] <https://www.indec.gov.ar>
- Labrador-Encinas, F. J., & Villadangos-González, S. M. (2010). Menores y nuevas tecnologías: Conductas indicadoras de posible problema de adicción [Minors and new technologies: Behaviors that indicate a possible addiction problem]. *Psicothema*, 22(2), 180-188. <https://www.psicothema.com>
- López-Fernández, O., Honrubia-Serrano, M. L., & Freixa-Blanxart, M. (2012). Adaptación española del “Mobile Phone Problem Use Scale” para población adolescente. *Adicciones*, 24(2), 123-130. <https://doi.org/10.20882/adicciones.104>
- Menglong, L., & Liya, L. (2017). La influencia de la adicción al teléfono móvil en la calidad de sueño de estudiantes secundarios dejados atrás: El rol mediador de la soledad [The influence of mobile phone addiction on left-behind middle school student’s sleep quality: The mediator role of loneliness]. *Revista Argentina de Clínica Psicológica [Argentine Journal of Clinical Psychology]*, 26(1), 71-81. <https://doi.org/10.24205/03276716.2017.1006>
- Merlo, L. J., Stone, A. M., & Bibbey, A. (2013). Measuring problematic mobile phone use: Development and preliminary psychometric properties of the PUMP Scale. *Journal of Addiction*, 912807. <https://doi.org/10.1155/2013/912807>
- Muthén, B., & Kaplan, D. (1985). A comparison of some methodologies for the factor analysis of non-normal Likert variables. *British Journal of Mathematical and Statistical Psychology*, 38(2), 171-189. <https://doi.org/10.1111/j.2044-8317.1985.tb00832.x>
- Pepper, R., Solomon, G., & Williams, C. (2012). What is the impact of mobil telephony on economic growth? *GSM Association*. <https://www.gsma.com/mobil-fordevelopment/wp-content/uploads/2014/10/gsma-deloitte-impact-mobile-telephony-economic-growth.pdf>
- Redondo-Pacheco, J., Rangel-Noriega, K. J., Luzardo-Briceño, M., & Inglés-Saura, C. J. (2016). Experiencias relacionadas con el uso de Internet y celular en una muestra de estudiantes universitarios colombianos [Experiences related to the use of the Internet and cell phones in a sample of Colombian university students]. *Revista Virtual Universidad Católica Del Norte [Virtual Magazine Catholic University of the North]*, 49, 7-22. <https://revistavirtual.ucn.edu.co/index.php/RevistaUCN/index>
- Richardson, M., Hussain, Z., & Griffiths, M. D. (2018). Problematic smartphone use, nature connectedness, and anxiety. *Journal of Behavioral Addictions*, 7(1), 109-116. <https://doi.org/10.1556/2006.7.2018.10>
- Richaud de Minzi, M. C. (2008). Nuevas tendencias en psicometría [New trends in psychometrics]. *Revista Evaluar [Evaluate Magazine]*, 8(1), 1-19. <https://doi.org/10.35670/1667-4545.v8.n1.501>
- Rodríguez-Ceberio, M., Díaz-Videla, M., Agostinelli, J., & Daverio, R. (2019). Adicción y uso del teléfono celular [Cell phone addiction and use]. *Ajayu Órgano de Difusión Científica del Departamento de Psicología UCBSB [Ajayu Organ of Scientific Dissemination of the Department of Psychology UCBSB]*, 17(2), 211-235. <https://app.lpz.ucb.edu.bo/Publicaciones/Ajayu/revista.html>
- Rozgonjuk, D., Levine, J. C., Hall, B. J., & Elhai, J. D. (2018). The association between problematic smartphone use, depression and anxiety symptom severity, and objectively measured smartphone use over one week. *Computers in Human Behavior*, 87, 10-17. <https://doi.org/10.1016/j.chb.2018.05.019>
- Ryding, F. C., & Kuss, D. J. (2020). Passive objective measures in the assessment of problematic smartphone use: A systematic review. *Addictive Behaviors Reports*, 11, 100257. <https://doi.org/10.1016/j.abr.2020.100257>

[abrep.2020.100257](https://doi.org/10.1089/cpb.2008.0164)

- Sánchez-Martínez, M., & Otero, A. (2009). Factors associated with cell phone use in adolescents in the community of Madrid (Spain). *CyberPsychology and Behavior*, 12(2), 131-137. <https://doi.org/10.1089/cpb.2008.0164>
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66(4), 507-514. <https://doi.org/10.1007/BF02296192>
- Simó-Sanz, C., Martínez-Sabater, A., Ballestar-Tarín, M. L., & Domínguez-Romero, A. (2017). Instrumentos de evaluación del uso problemático del teléfono móvil/Smartphone [Instruments for the evaluation of problematic use of mobile phones/Smartphones]. *Salud y Drogas [Health and Addictions]*, 17(1), 5-14. <https://ojs.haaj.org>
- Sohn, S. Y., Rees, P., Wildridge, B., Kalk, N. J., & Carter, B. (2019). Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: A systematic review, meta-analysis and GRADE of the evidence. *BMC Psychiatry*, 19(1), 356. <https://doi.org/10.1186/s12888-019-2350-x>
- Stover, J. B., & Tisocco, F. (2020). Generalized Problematic Internet Use Scale 2: Estudios psicométricos en adultos de Buenos Aires [Generalized Problematic Internet Use Scale 2: Psychometric studies in adults from Buenos Aires]. In *XII Congreso Internacional de Investigación y Práctica Profesional en Psicología. XXVII Jornadas de Investigación. XVI Encuentro de Investigadores en Psicología del MERCOSUR. II Encuentro de Investigación de Terapia Ocupacional. II Encuentro de Musicoterapia*. Facultad de Psicología-Universidad de Buenos Aires. [XII International Congress of Research and Professional Practice in Psychology. XXVII Research Conference. XVI Meeting of Researchers in Psychology of MERCOSUR. II Occupational Therapy Research Meeting. II Music Therapy Meeting. Faculty of Psychology-University of Buenos Aires]. <http://jimemo-rias.psi.uba.ar/index.aspx?anio=2020>
- Stover, J. B., Fernández Liporace, M., & Castro Solano, A. (2023). Generalized Problematic Internet Use Scale 2: Adaptación para adultos de Buenos Aires. *Revista de Psicología*, 41(2), 1127-1151. <https://doi.org/10.18800/psico.202302.017>
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6<sup>th</sup> ed.). Pearson.
- The Jamovi Project. (2023). Jamovi. (Version 2.3). [software de cómputo]. <https://www.jamovi.org>
- Toda, M., Monden, K., Kubo, K., & Morimoto, K. (2006). Mobile phone dependence and health-related lifestyle of university students. *Social Behavior and Personality: An International Journal*, 34(10), 1277-1284. <https://doi.org/10.2224/sbp.2006.34.10.1277>
- Turan, N., Polat, O., Karapirli, M., Uysal, C., & Turan, S. G. (2011). The new violence type of the era: Cyber bullying among university students: Violence among university students. *Neurology, Psychiatry and Brain Research*, 17(1), 21-26. <https://doi.org/10.1016/j.npbr.2011.02.005>
- van Velthoven, M. H., Powell, J., & Powell, G. (2018). Problematic smartphone use: Digital approaches to an emerging public health problem. *Digital Health*, 4, 1-9. <https://doi.org/10.1177/2055207618759167>
- World Health Organization. (2019). *International Statistical Classification of Diseases and Related Health Problems* (11<sup>th</sup> ed.). WHO.
- Xie, X., Dong, Y., & Wang, J. (2018). Sleep quality as a mediator of problematic smartphone use and clinical health symptoms. *Journal of Behavioral Addictions*, 7(2), 466-472. <https://doi.org/10.1556/2006.7.2018.40>